MORASH, MELANIE

From: Stralka, Daniel
Sent: Wednesday, October 30, 2013 10:10 AM
To: Hiatt, Gerald; Montgomery, Michael
Cc: MORASH, MELANIE; Plate, Mathew
Subject: FW: JandE Model results for GW concentrations
Attachments: JandEscreensforSouthBay.docx

Matt did some J&E calculations for HP to check the concentration of concern in gw. He arrived at 0.5-60 ppb for residential, this is projecting the indoor air level of 0.4 ug/m3 into gw, the 10-6 level, 25 ft depth to gw. The non cancer level would be 5 times higher or 2.5-300 ppb. Approaching it another way using the empirical screening levels from the VI guidance (indoor air to gw attenuation of 0.001 and Henry's Law conversion) the screening level is 1.1 ppb for 10-6 and 5 ppb for the non-cancer endpoint.

From: Plate, Mathew
Sent: Wednesday, October 30, 2013 9:03 AM
To: MORASH, MELANIE; Stralka, Daniel
Subject: JandE Model results for GW concentrations

Depth to GW 10 to 30 feet

Soil type Sand to Loam

Air exchange rate 0.1 to 0.5

Range of GW estimates for VI 0.5 ug/L to 60 ug/L (residential)

Typical ~ 5ug/L (residential)

matt

Based on J&E calculator:

http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.html

(note TCE risk in calculator needed to be changed it was set for provisional value)

Groundwater concentration ranges for screening from

0.5 ug/L to 60 ug/L

This does not account for all types of preferential pathways, uncertainty in groundwater concentrations, or buildings with sub-surface structures

Typical South Bay non-conservative

TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name:
Report Date: Wed Oct 30 08:50:57 PDT 2013
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 25ft +/- 2ft
Average ground water temperature: 18C

CHEMICAL PROPERTIES
Chemical of Concern: Trichloroethylene CAS Number: 79016
Molecular Weight: 131.39[g/mole] Henrys Constant: 0.3051373[unitless]
Diffusivity in Air: 7.900e-2[cm^2/sec] Diffusivity in Water: 9.100e-6[cm^2/sec]
Unit Risk Factor: 0.000006[$(\mu g/m^3)^{-1}$] Reference Concentration: 0[mg/m^3]

SOIL PROPERTIES
Soil Type: Loamy Sand Total Porosity: 0.39
Unsaturated Zone Moisture Content:
low= 0.049 best estimate= 0.076 high= 0.1
Capillary Zone Moisture Content: 0.303 Height of Capillary Rise: 0.188[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]

Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficients:
Unsaturated Zone(D_{eff}): 0.01097[cm^2/s]
Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.004056[cm^2/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0007613
Ground Water Attenuation Factor (α_{GW}): 0.0003118
Target Concentrations are based on CANCER risk.
Target Indoor Air Concentration: 0.4056[µg/m^3] or 0.07552[ppbv]

[1]Less Protective Target Concentrations
Soil Gas: 716.1[µg/m^3] or 133.3[ppbv]; Ground Water: 4.852[µg/L]

Best Estimate Target Concentrations
Soil Gas: 532.7[µg/m^3] or 99.19[ppbv]; Ground Water: 4.262[µg/L]

[2]More Protective Target Concentrations
Soil Gas: 397.2[µg/m^3] or 73.96[ppbv]; Ground Water: 3.827[µg/L]

Most Conservative

TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name:
Report Date: Wed Oct 30 08:49:15 PDT 2013
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 10ft +/- 2ft
Average ground water temperature: 18C

CHEMICAL PROPERTIES
Chemical of Concern: Trichloroethylene CAS Number: 79016
Molecular Weight: 131.39[g/mole] Henrys Constant: 0.3051373[unitless]
Diffusivity in Air: 7.900e-2[cm^2/sec] Diffusivity in Water: 9.100e-6[cm^2/sec]
Unit Risk Factor: 0.000006[$(µg/m^3)^{-1}$] Reference Concentration: 0[mg/m^3]

SOIL PROPERTIES
Soil Type: Sand Total Porosity: 0.375
Unsaturated Zone Moisture Content:
low= 0.053 best estimate= 0.054 high= 0.055
Capillary Zone Moisture Content: 0.253 Height of Capillary Rise: 0.17[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.1[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficients:
Unsaturated Zone(D_{eff}): 0.01277[cm^2/s]
Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.005466[cm^2/s]

Soil Gas Attenuation Factor (α_{SG}): 0.004275
Ground Water Attenuation Factor (α_{GW}): 0.002284
Target Concentrations are based on CANCER risk.
Target Indoor Air Concentration: 0.4056[µg/m^3] or 0.07552[ppbv]

[1]Less Protective Target Concentrations
Soil Gas: 108.0[µg/m^3] or 20.12[ppbv]; Ground Water: 0.6250[µg/L]

Best Estimate Target Concentrations
Soil Gas: 94.88[µg/m^3] or 17.67[ppbv]; Ground Water: 0.5820[µg/L]

[2]More Protective Target Concentrations
Soil Gas: 81.99[µg/m^3] or 15.27[ppbv]; Ground Water: 0.5398[µg/L]

Least Conservative

TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name:
Report Date: Wed Oct 30 08:45:11 PDT 2013

Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 30ft +/- 2ft
Average ground water temperature: 18C

CHEMICAL PROPERTIES
Chemical of Concern: Trichloroethylene CAS Number: 79016
Molecular Weight: 131.39[g/mole] Henrys Constant: 0.3051373[unitless]
Diffusivity in Air: 7.900e-2[cm^2/sec] Diffusivity in Water: 9.100e-6[cm^2/sec]
Unit Risk Factor: 0.000006[$(\mu g/m^3)^{-1}$] Reference Concentration: 0[mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.5[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficients:
Unsaturated Zone(D_{eff}): 0.004973[cm^2/s]
Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.001227[cm^2/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0001591
Ground Water Attenuation Factor (α_{GW}): 0.00004127
Target Concentrations are based on CANCER risk.
Target Indoor Air Concentration: 0.4056[$\mu g/m^3$] or 0.07552[ppbv]

[1]Less Protective Target Concentrations
Soil Gas: 1.178e4[$\mu g/m^3$] or 2193.[ppbv]; Ground Water: 61.31[µg/L]

Best Estimate Target Concentrations
Soil Gas: 2549.[$\mu g/m^3$] or 474.6[ppbv]; Ground Water: 32.20[µg/L]

[2]More Protective Target Concentrations
Soil Gas: 991.0[$\mu g/m^3$] or 184.5[ppbv]; Ground Water: 27.30[µg/L]